

Amendments to the Drawings:

The attached 5 sheets of drawings include changes to Figs. 4A, 4B, 5A, 5B, 6 and 7 in response to the Draftperson's patent review objections listed on Form PTO-948. These 5 sheets, which include Figs. 4A, 4B, 5A, 5B, 6 and 7 replace the previously submitted 5 sheets including Figs. 4A, 4B, 5A, 5B, 6 and 7.

Attachment: 5 Replacement Sheets

REMARKS/ARGUMENTS

In view of the foregoing amendments and the following remarks, the applicants respectfully submit that the pending claims are not anticipated under 35 U.S.C. § 102 and are not rendered obvious under 35 U.S.C. § 103. Accordingly, it is believed that this application is in condition for allowance. **If, however, the Examiner believes that there are any unresolved issues, or believes that some or all of the claims are not in condition for allowance, the applicants respectfully request that the Examiner contact the undersigned to schedule a telephone Examiner Interview before any further actions on the merits.**

The applicants will now address each of the issues raised in the outstanding Office Action.

Objections

Claim 2 is objected to because it includes a minor grammatical error. The Applicants have amended claim 2 to correct based on the Examiner's helpful comment. The Applicants respectfully request that the Examiner withdraw this ground for objection.

Rejections under 35 U.S.C. § 102

Claims 1, 7, 9, 13-15 and 18-20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Great Britain Patent No. 1,045,163 ("the '163 patent"). Claims 1 and

18 have been cancelled. Therefore, this ground for rejection with respect to claims 1 and 18 is moot.

Independent claims 7, 9 and 19, as amended, are not anticipated by the '163 patent because the '163 patent does not disclose at least two pairs of slits, each slit with endpoints on the outer periphery of the nut at the same axial position, nor does it disclose a polygon shaped nut having the particular features claimed. Claim 7, as amended, is reprinted below with these features depicted in bold typeface:

A **polygon shaped** nut having an internal female thread, a first opening from which a male thread to be screwed is inserted, and a second opening, from which the inserted male thread gets out; **wherein the nut comprises at least two pairs of slits** formed at an axial position closer to the second opening and such as to be symmetrical with respect to the axis of the nut and to radially partly penetrate the female thread from the outer periphery of the nut, a first axial part defined on the first opening side and a second axial part defined on the second opening side bounded by the pairs of slits, and the female thread parts of the first and second axial parts have the same shape parameter, and the direction of the surface, in which the female thread part in the second axial part is formed, is deviated from the axial direction as a result of plastic deformation due to pressure that had been exerted on the nut, and **wherein each slit of said at least two pairs of slits has two endpoints on the outer periphery of the nut, and**

**wherein each of said endpoints
is at the same axial position.**
[Emphasis added.]

Claims 9 and 19, as amended, recite similar features.

First, Figures 9 and 10 of the '163 patent cited by the Examiner as embodiments with multiple pairs of slits, show a **round** shaped nut, not a **polygon** shaped nut as claimed. Also see text in the '163 patent column page 3 left column lines 11-16 which recites:

In the embodiment according to Figs. 9 and 10 there are provided four slots 33, 34, 35 and 36, lying symmetrically around the axis of the nut. As here it is a question of a **round nut** with four axial grooves in its periphery, **as distinct from a flat-sided nut** ..[Emphasis added.]

Accordingly, independent claims 7, 9 and 19, as amended, are not anticipated by the '163 patent for at least this reason.

Second, claims 7, 9 and 19, as amended, of the present application recite that the **two endpoints of a slit** on the outer periphery of the nut **are at the same axial position**. In contrast, the slots in Figures 9 and 10 of the '163 patent are **inclined cuts** and the **two endpoints of each slit** on the outer periphery of nut **are at different axial positions**. Also see text in the '163 patent page 2 left column lines 28-32 which recites, in part:

the **slots ... inclined** to the nut axis by a few minutes more than the thread pitch angle
[Emphasis added.]

Accordingly, independent claims 7, 9 and 19, as amended, are not anticipated by the '163 patent for at least this additional reason.

Since claims 12-16 depend either directly or indirectly from independent claim 7, these claims are also not anticipated by the '163 patent. Since Claim 20 depends from independent claim 19, it is similarly not anticipated by the '163 patent.

Claim 25 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Great Britain Patent No. 0551534 ("the '534 patent"). Since claim 25 has been cancelled, this ground for rejection is moot.

Claims 2-6, 8, 10, 11, 22-24 and 26 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 2,391,712 ("the King patent"). Independent claims 2, 8, 10 and 11 are not anticipated by the King patent because the King patent does not show that all cuts are at the same, single, axial position of the nut. Claim 2, as amended, is reprinted below with this feature depicted in bold typeface:

A loosening-proof nut comprising a nut body having a central female thread with a nominal diameter d , the nut body having an upper portion and a lower portion, wherein the maximum outer diameter of the upper portion is less than the minimum outer diameter of the lower portion, the nut body also having two slits formed such as to be symmetrical with respect to the axis of the nut, the two slits radially penetrate the female thread from the outer periphery of the nut, said slits are located in the upper portion of the nut body and are located **at the same position in an axial direction of the nut body and located** at an axial position on an upper side of an axial

center position of the nut body, the slits defining push parts, which ~~are~~ have been bent downward resulting in plastic deformation, the slits consist of a first and a second slit symmetrical with respect to the axis of the nut **such that all cuts are at a single axial position and the remaining upper portion is substantially solid outside of the female threaded portion**, the push parts consist of a first and a second push part defined in the upper portion of the nut body by the first and second slit. [Emphasis added.]

Claims 8, 10 and 11 recite a similar feature.

In claims 2, 8, 10 and 11 (amended) of the present application, the slits are located at the **same position in the axial direction**. In the King patent, although two cuts are made at right angles to the axis of the nut, the two cuts, made at diametrically opposite points, are made in different planes. In other words, in the King patent, the cuts are at **different positions (or more than one position) in the axial direction**. In addition, in the King patent, each cut is continued well beyond the axis of the nut until it has cut right through the tapered hole of the nut. If the cuts in the King patent were at the same axial position, the upper part of the nut would be detached from the lower part of the nut, thereby destroying the utility of the nut. Clearly, the King patent does not disclose slits which are located in the upper portion of the nut body and all of which are located at the same position in an axial direction of the nut body as recited in claim 2 (amended) of the current application.

In addition, with respect to claims 2, 8, 10 and 11, as amended, of the present application, by having the two slits formed at the same position in the axial direction of the nut body, manufacturing the nut is made easier. For example, the two slits formed at the same axial position in an axial direction of the nut body can be obtained by using a cutting tool such as a milling cutter performing simultaneous cuts at the same axial position from opposite directions. Alternatively the two slits formed at the same axial position can be formed using a single cutter performing two sequential cuts, with the nut being rotated between cuts, but without the need to reposition the cutting height setting.

For at least the reasons stated above, independent claims 2, 8, 10 and 11, as amended, are not anticipated by the King patent. Since claims 3-6, 22-24 and 26 depend either directly or indirectly from independent claim 2 (amended) they are similarly not anticipated, by the King patent.

Claims 2-6, 8, 10, 11, 21-24 and 26 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 2,487,219 ("the Butler patent"). However, independent claims 2, 8, 10 and 11, as amended, are not anticipated by the Butler patent for at least the same reasons discussed about with respect to the King patent.

In the Butler patent, a plurality of resilient locking fingers 13 having portions 14 joining them to the body are provided. The fingers 13 are accurate and extend concentric with the axis of the bore 11. When the nut including these fingers, having a right hand thread, is screwed onto a bolt to cause the fingers to firmly

engage a seating surface, the fingers will cause the nut to be firmly held in place against an accidental or incidental loosening. In the locked-up position, the fingers 13, are flexed so that they lie practically in one circle concentric with the axis of the nut. The pressure of the movable ends 15 of the fingers is maintained by flexure. Should the nut begin to turn and attempt to loosen (e.g., due to vibration), the sharp corners 16 of the fingers will bite into the seating surface and prevent any further such action. (See Col 2 lines 22 - col. 2 lines 55.)

In a variation of the Butler patent nut as shown in Figure 8, the locking fingers 13f are provided with internal threads 11f lying in the same helix as the threads of the bore, so that when the nut is pulled up tightly against a seating surface, causing flexure of the fingers 13f, the threads 11f thereof will distort the threads of the screw carrying the nut, and jam the latter on the screw. (See column 4 lines 3-11.)

The structures of the Butler patent includes fingers resembling a split locking washer or portion thereof being attached to a nut. The locking is provided by compression/distortion of the fingers against a seating surface and jamming as the fingers are forced against a seating surface.

This approach of the locking feature and nut structure to achieve the locking of the Butler patent is in contrast to the invention of amended claim 2 of the present invention, in which the defined push parts have been bent downward as part of a manufacturing process resulting in plastic deformation and the push parts are not jammed against a mounting surface to secure the nut.

In addition, the Butler patent does not show that the slits consist of a first and a second slit symmetrical with respect to the axis of the nut such that all cuts are at a single axial position and **the remaining upper portion is substantially solid** outside of the female threaded portion as recited by claims 2, 8, 10 and 11 (amended) of the present invention.

Generally, the Butler patent does not disclose a loosening-proof nut comprising the combination of a nut body having a central female thread with a nominal diameter d , the nut body having an upper portion and a lower portion, wherein the maximum outer diameter of the upper portion is less than the minimum outer diameter of the lower portion, the nut body also having two slits formed such as to be symmetrical with respect to the axis of the nut, the two slits radially penetrate the female thread from the outer periphery of the nut, said slits are located in the upper portion of the nut body and are located at the same position in an axial direction of the nut body and located at an axial position on an upper side of an axial center position of the nut body, the slits defining push parts, which have been bent downward resulting in plastic deformation, the slits consist of a first and a second slit symmetrical with respect to the axis of the nut such that all cuts are at a single axial position and the remaining upper portion is substantially solid outside of the female threaded portion, the push parts consist of a first and a second push part defined in the upper portion of the nut body by the first and second slit, as recited by claim 2 (amended) of the present application.

The structure of the Butler patent and the locking feature is clearly different from the featured structure of the present application as recited in independent claims 2, 8, 10 and 11, as amended. For at least the reasons stated above, amended claims 2, 8, 10 and 11 are not anticipated by the Butler patent.

Since claims 3-6, 22-24 and 26 depend either directly or indirectly from independent claim 2 (amended), they are similarly not anticipated by the Butler patent.

Rejections under 35 U.S.C. § 103

Claims 12 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the '163 patent, further in view of the King patent. The Examiner states that the '163 patent shows and discloses each limitation in claim 7, but lacks disclosure that the outer periphery of the second axial part is circular in shape. To compensate for this admitted deficiency in the '163 patent, the Examiner relies on the King patent. However, even assuming arguendo, that the King patent teaches this missing feature, and that one skilled in the art would have been motivated to modify the '163 patent as proposed by the Examiner, this proposed combination still would not compensate for the deficiencies of the '163 patent with respect to claim 7, discussed above. That is a0s described above, the '163 patent does not include the feature of claim 7 (amended) of ***each slit of said at least two pairs of slits having two endpoints on the outer periphery of the nut, and wherein each of said endpoints is at the same axial position.*** For at least

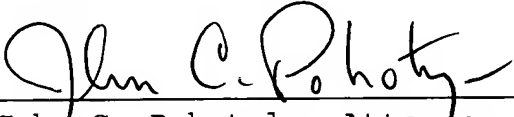
this reason claims 12 and 16 are not anticipated or rendered obvious by the '163 patent in view of the King patent.

Conclusion

In view of the foregoing amendments and remarks, the applicants respectfully submit that the pending claims are in condition for allowance. Accordingly, the applicants request that the Examiner pass this application to issue.

Respectfully submitted,

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CERTIFICATE OF MAILING under 37 C.F.R. 1.8(a)

I hereby certify that this correspondence is being deposited on **April 19, 2005** with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.


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